CLAIMS

1. A sensor with a movable microstructure, comprising a sensitive element formed in a first chip of semiconductor material for producing an electrical signal dependent on a movement of at least one movable microstructure relative to a surface of the first chip, the sensitive element being enclosed in a hollow hermetic structure, and a processing circuit for processing said electrical signal formed in a second chip of semiconductor material, the hollow hermetic structure including a metal wall disposed on a surface of the first chip around the sensitive element, the second chip being fixed to said wall.

2. A sensor according to claim 1 wherein the metal wall is comprised substantially of nickel.

3. A sensor according to claim 1, further comprising at least one first conductive pad formed on the surface of the first chip within the hollow hermetic structure and connected electrically to the sensitive element, each first conductive pad being connected to a second, facing conductive pad formed on a surface of the second chip for transmitting the electrical signal to the processing circuit.

4. A sensor according to claim 3, further comprising at least one third conductive pad formed on the surface of the first chip within the hollow hermetic structure, each third pad being connected to a fourth, facing conductive pad formed on the surface of the second chip for receiving an electrical signal processed by the processing circuitry.

5. A sensor according to claim 4, further comprising at least one fifth conductive pad formed on the surface of the first chip outside the hollow hermetic structure, each fifth pad being connected electrically to a corresponding third pad for transmitting the processed electrical signal outside of the sensor.

6. A sensor according to claim 1 wherein the sensor comprises an inertial sensor.

7. An electronic device comprising the sensor according to claim 1 and a plastic package in which the sensor is encapsulated.

8. A method of producing sensors with movable microstructures comprising the steps of:

forming, in a first wafer of semiconductor material, a plurality of sensitive elements each for producing an electrical signal dependent on a movement of at least one microstructure relative to a surface of the first wafer;

forming a first metal frame on the surface of the first wafer around each of the sensitive elements;

forming, in a second wafer of semiconductor material, a plurality of processing circuits for processing the electrical signal;

forming, on a surface of the second wafer, a second metal frame corresponding to each of the first metal frames;

cutting the second wafer to produce a plurality of chips of semiconductor material each containing one of the processing circuits and one of the second frames; and

fixing the second frame of each chip to a corresponding first frame in order to enclose each sensitive element in a hollow hermetic structure.

9. A method according to claim 8, in which the step of fixing the second frame is carried out by a welding process.

10. A method according to claim 8, further comprising, before the step of cutting the second wafer, the step of growing a metal bump on each of the second frames.

11. A method according to claim 10 wherein the step of growing a metal bump comprises growing a metal bump on each of the second frames with a non-electrolytic growth process.

12. A sensor comprising:

a first chip of semiconductor material;

a sensor element having a movable microstructure, the sensor element being supported by the first chip and being structured to generate a first signal in response to a movement of the microstructure relative to the first chip;

a second chip of semiconductor material; and

a wall surrounding the element and connecting the first chip to the second chip, the wall defining a hermetically sealed chamber between the first chip and the second chip and enclosing the sensor element.

13. A sensor according to claim 12 wherein the wall is comprised of a metal.

14. A sensor according to claim 12, further comprising a processing circuit coupled to the sensor element to receive the first signal, the processing circuit being structured to process the first signal and generate a second signal based on the first signal.

15. A sensor according to claim 14 wherein the processing circuit is formed in the second chip.

16. A sensor according to claim 12, further comprising:

a plurality of conductive pads connected between the first chip and the second chip; and

a low resistance diffusion in the first chip between the sensor element and the pads.

17. A sensor according to claim 12, further comprising at least one output terminal outside the sealed chamber and coupled to the processing circuit to receive the second signal.

18. A sensor according to claim 12 wherein the sensor element comprises an inertial sensor.

19. A sensor according to claim 12 wherein the sensor element comprises a resonant sensor.

20. A sensor according to claim 12 wherein the sealed chamber encloses a gas at a pressure below atmospheric pressure.